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LIST

OF THE

Ores and Minerals of Industrial Importance,

OCCURRING IN ALABAMA.

BY
EUGENE A. SMITH, Ph. D.,
State Geologist.

Alabama. Geol. survey

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ORES, MINERALS AND MINERAL SUBSTANCES—Continued.

Mineralogical Name.	Common Name.	REMARKS.
		In the present State of our knowledge, it is impossible to give either the thickness of the Coal Measures, or the number of coal seams in the Warrior field; but recent explorations have demonstrated the existence of several thick seams of coal underlying considerable areas in Jefferson, Tuscaloosa, and Walker counties. On account of the great width of the Warrior Basin; the approximately horrizontal position of the measures; and the undulations in the stratas by which the basin appears to be divided into a number of smaller basins, the difficulties in the way of constructing a true section of the measures are enormous. Good sections however, have been made of the measures over limited areas, but the task of combining these, belongs to the future.
Covellite.....	Indigo Copper.	S. 24, T. 19, R. 7 E., Clay county, with pyrite and quartz in small quantity.
Chalcopyrite.	Copper pyrites, yellow copper ore.	Woods' Mines in Cleburne county, a bedded lode with pyrite in mica schist; Smith's Mine, near Woods, Cleburne county; T. 21, R. 6 E., in Clay county, with pyrite in quartz rock; T. 20, R. 7 E., and also near Ashland, Clay county; T. 23, R. 22 E., Tallapoosa county; and in small quantities at many other localities in Talladega, Randolph, Clay, Tallapoosa, and Coosa counties. Smelting works erected at Wood's Mine, not now in operation.
Corundum...	Emery	Near Dudleyville, Tallapoosa county, and 10 to 15 miles to southwest; near Mt. Olive, Coosa county. Veins or seams appear to be generally broken down, and too much altered to be utilized.
	Fire clay....	So-called fine clay is common in the Coal Measures, below the coal seams. Fire bricks are manufactured at Bibbville, Bibb county, which are extensively used; but a first class fire clay is yet to be discovered in Alabama.
	Flagging Stone.	In the yellow sandstone of Red Mountain group, bordering the valley from Bucksville, northeastward to Georgia; at Pratt's Ferry, on Cahaba river. Sandstone flags of the Coal Measures at Plank Shoals on North river, Tuscaloosa county. Thin-bedded limestones in Lower Silurian and in Sub-Carboniferous groups. Also gneisses and mica-schists of metamorphic region. Fine quarries at Tallassee falls on Tallapoosa river, in Siliceous slates (itacolumite). Same rock quarried at Farrell's Mill and other local-

ORES, MINERALS, AND MINERAL SUBSTANCES—Continued.

Mineralogical Name.	Common Name.	REMARKS.
		ities in Lee county. Many localities opened for local supply, especially for head stones, &c.
Galenite . . .	Galena, lead ore.	Near the Old Benton Iron Works in Calhoun county; also in T. 14, R. 7 E.; near Guntersville, on Tennessee river in Marshall county; near Elyton, Jefferson county. Nowhere in workable quantity. In every part of the State galena is found in lumps on the surface.
Gold	Gold	Arbacoochee and Chulifinnee Mines in Cleburne county; Riddle Mine, Talladega county; Stewart's Mine, and other localities on Weoguffka and Hatchet creeks, Coosa county; Pinetucky Mine, and other openings in Randolph county; Haral's Mine in Clay county; Goldville, Tallapoosa county; Ripito Mines, Chilton county. In all the counties above named gold is found both in quartz veins, and in surface gravels. The gold bearing gravels seem to have been pretty thoroughly worked over forty years ago. The quartz viens have been worked in stamp mills at several places recently, e. g. near Arbacoochee, at Chulifinnee, and at Pinetucky, &c., but there is, I believe, no mill now in operation. Gold has also been found in quartz pebble beds in the Coal Measures, near Fayette Court House, Fayette county, and near Gold Mine, Marion county; these localities are at a considerable distance from any region where gold bearing rocks are *in situ*, and the gold is associated with the Drift gravel brought from a distance.
	Granite	Many localities in the Metamorphic Region. Worked for local supply only. Near Bradford, and Rockford in Coosa county; Notasulga, Macon county; Auburn and Chewacla, Lee county; Tallassee, in Tallapoosa county; Milltown, Chambers county; Blake's Ferry, Randolph county. These are not true granites, but thick-bedded gneisses.
Graphite	Plumbago, black lead.	In many localities in Chilton, Coosa, Clay, Cleburne, Randolph, Chambers and Tallapoosa counties. Dug near Millerville, Clay county; near Milltown, Chambers county; and between Wedowee and Louina, in Randolph county, for use in lubricating axles, cotton press screws, &c. Occurs in black graphitic schists; also, impregnating argillaceous schists.
Halloysite .	Porcelain clay, in part.	Near Sulphur Springs station, in DeKalb county-where it is extensively mined for manufacturfers of fine pottery. Also, found southeastr-, Stevenson, in Jackson county; both occeu

ORES, MINERALS, AND MINERAL SUBSTANCES—Continued.

Mineralogical Name.	Common Name.	REMARKS.
		rences in the cherty strata of lower Sub-Carboniferous, as probably also a similar material found near Calera, in Shelby county.
Hematite	**Fossil ore, dyestone ore, red iron ore.**	Interstratified with the shales and sandstones of the Clinton group of the Lower Silurian, along each border of the anticlinal valleys of the State. In Brown's Valley, extending from Reid's Gap northeastward to Tennessee line—the red ore makes its appearance at a few localities in Marshall and Jackson counties. In Murphrees' Valley from Village Springs northeastward, on both sides of the valley, are beds of this ore of extraordinary thickness and good quality, not yet utilized because of inaccessibility. In Roups' and Jones' Valley, extending from Big Sandy creek, near Clements' Mill, in Tuscaloosa county, to Village Springs and Springville, this ore is seen in the Red Mountains on both sides of the valley. From Bucksville to Jonesboro, on the western side of the valley, the Red Mountain is duplicated, and the duplicate, known by the name of McShan Mountain, holds a fine bed of ore, in which mines are worked. On the eastern side of the valley mines are also worked at Sloss', Hilman's, Eureka Mines, &c., southwest of Birmingham. Above Birmingham, mines have been opened just west or southwest of Springville. In the Cahaba Valley, between Cahaba and Coosa Coal-fields, the ore is on the eastern side of the valley - not mined. In Coosa Valley, lying northeast of Cahaba Coal-field, and east of Lookout Mountain, are many fine beds of ore. On the western side of the valley, mines are worked near Springville, and at Attala at the entrance of Wills' Valley. Further to the east are two red ore ridges, running parallel to each other, and east of Ashville, St. Clair county, with a northeastern trend—not yet mined. A red ore ridge runs parallel with the eastern edge of Lookout Mountain from Gadsden to the Georgia line—now mined near Gadsden. East of this, other red ore ridges extending from Round mountain in Cherokee county to Georgia, worked at Round mountain, and Gaylesville, in Cherokee county. In Wills' Valley from Attala northeastward to Rising Fawn in Georgia, red ore ridges on both sides of the valley, usually conspicuous only on one side. Mines at Portersville and one or two other points. Another horizon of oolitic red ore is just below the Trenton limestone; the bed is only a few

ORES, MINERALS, AND MINERAL SUBSTANCES—Continued.

Mineralogical Name.	Common Name.	REMARKS.
		feet in thickness. It has been seen near Pratt's Ferry in Bibb county, and at several places in Jones' Valley, southwest of Birmingham, and can no doubt be found at many other points. Hematite occurs, also, in thin crystalline scales, impregnating crystalline schists in Coosa, Clay, Talladega, and Tallapoosa counties.
Kaolinite....	Kaolin, porcelain clay.	Near Jacksonville, Calhoun county, and near Louina, Randolph county (Tuomey). Also near Socopotoy, in Coosa county; in the two last named localities, the result of alteration of feldspar. Not yet utilized. (See, also, Haloysite).
Lignite......	Brown coal, wood coal.	In the Cretaceous formation, trunks of trees converted into lignite are not uncommon in the strata underlying the Rotten limestone. No *bed* of lignite yet observed; localities: Pickens, Greene and Hale counties. In the Tertiary formation are several beds of lignite of considerable thickness in Sumter, Choctaw, Marengo, Wilcox, and other counties. Not yet utilized in this State. “Burning cut,” in Sumter county, and Coal Bluff, on Alabama river, are well known localities.
Limonite...	Brown iron ore, brown hematite.	Occurs as “gossan,” at outcrop of pyritous ores, in Cleburne, Clay, Coosa, and other counties in the *Metamorphic region*. Also, in concretionary masses associated with hornblendic rocks in same region, formerly worked at several localities in Talladega, Clay, and Chilton counties. In concretionary masses in the clays, &c., associated with the *lower Silurian (Calciferous)* limestones of the great valleys of the State. In the Coosa Valley this ore has been mined at various localities from Shelby county northeastward to Georgia—as at Columbiana, Shelby county; Alabama Furnace, (Jenifer), Talladega county; Woodstock Furnace, at Anniston, Calhoun county; on Cane Creek, in western part of same county; several localities in Cherokee county, for Stonewall, Rock Run, and Tecumseh furnaces. In Cahaba Valley, this ore occurs at intervals from near Centreville, in Bibb county, northeastward through Shelby and St. Clair counties to Gadsden, in Etowah county. In Roup's and Jones' Valley, ore at many places in Bibb, Tuscaloosa and Jefferson counties; mines near Woodstock, Greenpond, Tannehill, &c. In Murphree's Valley no mines worked, for lack of transportation, but many fine ore banks in this valley in Blount county.

ORES, MINERALS, AND MINERAL SUBSTANCES—Continued.

Mineralogical Name.	Common Name.	REMARKS.
		In Wills' Valley, mines at several points between Attala and Georgia line.
		In Brown's Valley this ore appears at several places in Marshall and Jackson counties.
		The cherty limestones of the *Sub-Carboniferous* formation usually hold a large amount of limonite. In the narrow anticlinal valleys of middle Alabama, the ore is rarely found in banks of economical importance, but in the Tennessee Valley in North Alabama are banks of great importance, formerly worked, for many years neglected, but now again about to be brought into use. The best known of these banks are in Franklin county in Russll's Valley: near Cedar creek, Russellville and Newburgh; others of less importance in Lawrence county, &c.
		Possibly of same geological age, but associated with *Drift deposits*, is the ore bank near Vernon, Lamar county, which once supplied a furnace.
		Overlying the *uppermost Cretaceous* and *lower-most Tertiary* strata in Alabama, we find some extensive beds of limonite, much of it "needle ore." As typical localities may be cited, near Fort Deposit, in Lowndes county, and the northern part of Butler, southern part of Montgomery county, and vicinity of Eufaula, Barbour county. None of these deposits have as yet come into use. They have usually been considered as of Drift age, but they follow very closely the outcrop of the upper cretaceous limestones and may be connected with these.
		Southward from the line thus indicated are numerous local occurrences of limonite, sometimes in considerable, and perhaps workable quantity, in Pike, Covington and other counties. These are associated with the Drift deposits, but may be derived from the underlying Tertiary. None as yet utilized.
Magnetite ...	Magnetic ore.	Impregnating sandstones, at Odom's mill, and Pope mountain, Talladega county: in loose blocks, fragment of a seam, near Kennedy's, Clay county; near Fredonia and near Oak Bowery, in Chambers county; T. 24, R. 20, E, in Coosa county, in crystals; south of Wedowee in Randolph county; Millersville, Clay county. Nowhere mined.
Manganese ore (Pyrolusite).	Manganese.	Near Greenpond and other localities in Tuscaloosa and Bibb counties; Anniston, in Calhoun county, where it has been used by the Woodstock Iron Company in the manufacture of ferro-manganese; near Kelly's creek P. O., St. Clair county, and in many other localities of occurrence of lower Silurian limonites. (See

Mineralogical Name.	Common Name.	REMARKS.
		above.) Also, in the Metamorphic region, south of Candutchkee, in Clay county.
	Marble......	White crystalline marble occurs four miles west of Talladega, and at many points towards the southwest, near Syllacauga in Talladega county. This is the well known "Talladega" marble, obtained at Nix's, Taylor's, Herd's, and Gantt's and other quarries. A black marble has been obtained at several places in southwestern Talladega. White, crystalline marble of the composition of dolomite, at Chewacla Lime Works, Lee county, and at other places northeast and southwest. Much of the non-crystalline, fossiliferous, limestone of the Trenton formation, occurring in Bibb, Shelby, and the other counties named as localities of hematite; will take a good polish and would serve as marble. A variegated marble of this kind, red and white, is found near Bucksville, in Jefferson county. A compact, gray, non-crystalline, and non-fossiliferous limestone of calciferous age, has been quarried near Pratt's Ferry in Bibb county, used in the Court-house at Marion, Perry county. Some of the limestones of the Clinton formation (Red Mountain) are beautifully variegated, and will probably some day be utilized. Variegated fossiliferous limestones of the lower Sub-Carboniferous formation, occurring at many localities in Colbert, Lauderdale, Sumter, Franklin, Madison, Lawrence, and other counties in the Tennessee valley make fine marbles. Works at Dickson, in Colbert county. The Mountain Limestone at many points in Alabama is of great purity, and would make good marble. Some of the limestone of the Ripley group of the upper Cretaceous, is firm, and crystalline; and a yellow and white crystalline limestone of Tertiary age is mentioned in Tuomey's Report as occurring at Gainestown in Clarke county. If found in blocks of sufficient size, both the Cretaceous and Tertiary limestone might serve as marbles.
	Marls........	Under this head we include not only the marls proper, but also all the greensands and other materials which may be valuable as fertilizers. 1. *Greensand marls.*—These occur at several horizons in the Cretaceous formation—the most important yet known, is that lying just below the Rotten Limestone, since it contains from five to ten per cent. of phosphoric acid. Its thickness varies—average perhaps three feet: occurs in Pickens, Greene, Hale, Perry,

Mineralogical Name.	Common Name.	REMARKS.
		Autauga, Elmore, and Macon counties. In the strata underlying the above, greensands also occur at several horizons, not utilized. In the Tertiary formation are likewise several important beds of greensand, occurring in Choctaw, Marengo, Clarke, Wilcox, Monroe, Butler, Conecuh, Coffee, Pike, Crenshaw, Russell, Bullock, and Barbour counties. One belt at least of these contains a considerable percentage of phosphoric acid. 2. *True marls (phosphatic).*—In the upper strata of the Cretaceous formation, near the summit of the Rotten Limestone, the clayey limestones, in disintegrating yield marls of great value, especially as they hold considerable phosphoric acid. These marls occur at Livingston, Coatopa, and at other localities across the State to Fora, in Bullock county. The clayey limestone of the Jackson group of the Tertiary formation also yields a marl on disintegration, and forms the basis of the "Lime Hills" region of the State. This marl in places, perhaps generally, contains a large percentage of phosphoric acid, as at St. Stephens in Washington county, and near Grove Hill, in Clarke county. 3. *Shell marls.*—Beds of partially decomposed shells—valuable as calcareous manure—occur both in Cretaceous and Tertiary formations. Among the most important are the Nanafalia and Claiborne beds, which outcrop in several counties—Butler, Clarke, Monroe, etc. 4. *Gypsum.*—This mineral is found in Choctaw and Clarke counties in quantities which appear to be of commercial importance. Also in the upper part of Cretaceous formation in Dallas county gypsum has recently been found. Marls have heretofore been very sparingly used in this State, but since the discovery of the phosphatic character of many of them, there is no doubt that they will hereafter be much more generally used, and to the great advantage of the regions in which they occur.
Melaconite.	Bl'ck oxide of copper, black copper.	This ore is found with other ores of copper at Wood's Copper Mines, in Cleburne county; also in T. 20, R. 7, E., Clay county. (Copper Mine).
	Millstones & grindstones.	At the base of the Coal Measures in Alabama, is a conglomerate, sometimes known as Millstone grit. This has been quarried for millstones at many points along its outcrops on both sides of the anti-clinal valleys of the State. A ferruginous conglomerate, apparently of Drift

Mineralogical Name.	Common Name.	REMARKS.
		Age, is extensively used for this purpose in Marion county. A siliceous rock (Buhrstone) of the Lower Eocene in Choctaw, Clarke, Wilcox, Monroe, Butler, Crenshaw and Pike counties, has sometimes been used as millstone. Granite of Coosa, Tallapoosa, Chambers and Randolph counties is made into millstones at most of the "flat rock" outcrops. A porphyritic gneiss is quarried for millstones near Chewacla, Lee county. A sandstone of Lower Silurian or Cambrian age is used for grindstones in southwestern part of Talladega county. Whetstones are made from Coal Measures sandstone near Eldridge, Walker county.
Muscovite	Mica	Some mining done recently, T. 22, R. 16, E, Chilton county; Old Mines in T. 18, R. 11, E, Randolph county, and in T. 20, R. 6, E, Clay county, and near Bowdon, Clay county. In North Carolina, similar old mines, when reopened, have never failed to yield the best quality of mica.
	Ochres	Red ochre of good quality is found some distance southeast of Fayette C. H., and also east of Talladega, in Talladega county. (Composition—Ferric oxide, 82.6; Alumina, 4.4; Silica, 11.8.) Yellow ochre is mined to some extent near Coosada Station, in Elmore county. Numerous other localities for ochre are known, as near Bucksville, in Jefferson county, etc., but it is not mined.
	Phosphates	The recently discovered phosphates of Alabama occur both in Cretaceous and Tertiary formations and at four distinct geological horizons, at least. There are, 1° at the base of the Rotten Limestone and 2° at the summit of the same, in the Cretaceous; and 3° at the Nanafalia, and 4° at the St. Stephens horizons in the Tertiary. *Cretaceous.* The phosphatic material occurs (*a*) in irregular nodules (coprolites, pseudo-coprolites) of nearly pure phosphate of lime; (*b*) impregnating greensands; and (*c*) impregnating siliceous limestones. In the pure form of nodules, the average content of phosporic acid is about 25 per cent. If found in sufficient quantity these will be of great commercial value. The phosphatic greensand occurs in several counties (see above under marls), and is in sufficient quantity, and contains phosphoric acid enough to make it a most valuable fertilizer. In fertilizing effect it will

ORES, MINERALS, AND MINERAL SUBSTANCES—Continued.

Mineralogical Name.	Common Name.	REMARKS.
		not fall behind the New Jersey greensand, which has wrought such a revolution in the agriculture of that State. The phosphatic limestone also occurs in many counties across the State. In places it is disintegrated into a phosphatic marl ("Hill Prairie Region"); and at many localities in Sumter, Marengo, Dallas, and other counties, doubtless holds phosphoric acid enough to justify the burning of the rock for agricultural purposes. *Tertiary*, The occurrence of the phosphatic material in the Tertiary is similar to that of the Cretaceous. (*a*) In nodules of nearly pure phosphate of lime, which if abundant enough will doubtless be largely exported. (*b*) Impregnating the calcareous rocks and giving rise to the formation of phosphatic marls. Much of the "Lime Hills" region possesses soil fertilized naturally by marls of this kind. The discovery of phosphates in Alabama is of so recent a date that neither their extent nor their commercial value have as yet been clearly set forth. Enough, however, is already known to show that the agriculture of Alabama will be profoundly modified by this discovery.
Pyrite.......	Pyrites......	Smith's and Wood's Copper Mines, Cleburne county: with copper ores: T. 19, R. 7, E, Clay county, a thick bed accompanied by Covellite. Montgomery Copper Mines, Clay county, in very large quantity; also T.T. 20-21, and R.R. 7 7. E Clay county, with copper pyrites. In small quantity, concretionary masses, &c., it is found in every part of the State.
Pryolusite...	....	(See Manganese ore.)
Quartz......	Quartz......	T. 22, R. 16, E, Chilton county, occurs a friable quartz rock, of the appearance of loaf sugar; also in Randolph, Tallapoosa, northwest Macon, Lee, Chambers, and other counties In the Tennessee Valley the siliceous (cherty) rocks of the Sub-Carboniferous formation yield, at many places, a fine white pulverulent silica, that might be used as material for glass making.
	Sandstone...	Potsdam sandstone in Calhoun, Cherokee, and Talladega counties. A ripple marked sandstone is quarried near Red Gap, Jefferson county, for curbstones, flags, &c. In DeKalb county, Wills' Valley, a yellowish sandstone from Clinton formation is used in building. A fine-grained, light gray sandstone of Coal Measures is quarried near Cullman, and quiet

ORES, MINERALS, AND MINERAL SUBSTANCES—Continued.

Mineralogical Name.	Common Name.	REMARKS.
		extensively used for building purposes. Some of the trimmings in the new government building in Montgomery are of this material.
Siderite.....	Spathic iron ore. Carbonate of iron.	The variety known as clay iron stone, or kidney ore, is quite common in our Coal Measures in Jefferson, Walker and other counties, and will some day possibly be utilized, after the red and brown ores of the valley become scarce.
Siderite (2)..	Black band..	Newcastle Station and Warrior Station, in Jefferson county, and at several other localities in Walker and Jefferson and Tuscaloosa counties. This ore has been tested, with satisfactory results, at several places, but it is nowhere at present regularly mined.
	Slate........ (for roofing.)	T. 21, R. 3, E., in Talladega county; Buxahatchee creek, in Shelby county; T. 19, R. 7, E., Clay county; also, near Anniston, Calhoun county. No quarries worked.
Sphalerite...	Zinc blende.	Wood's copper mine, Cleburne county.
Talc.........	Soapstone, Steatite..	Dudleyville and for several miles southwest, in Tallapoosa county; Oak Bowery, Chambers county, quarried for lining of lime kilns; T. 23, R. 25, E., in Chambers county, worked into headstones, &c., at Jackson's Mills; Randolph and Clay counties; Ancient excavations in Tallapoosa, Chambers, Coosa, Clay, and Lee counties.

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